

Abstract

An electronic device including a crystalline substrate, an electrode formed on and epitaxial to the substrate, the electrode including a first superconductive oxide, an insulator formed on and epitaxial to the electrode, a barrier that includes an ion-treated surface of the first superconductive oxide, and a counter-electrode formed on and epitaxial to the electrode and the barrier, the counter-electrode including a second superconductive oxide, whereby a Josephson junction is formed between the electrode and the counter-electrode. A superconductor device that includes an oxide superconductor having a surface exposed to ambient environment, and a passivation layer covering at least a portion of the surface of the oxide superconductor that is exposed to the ambient environment. Methods of forming the above devices are also included.